CHAPTER V Geography and Economic Development

Mountains, Deserts, Steppes, and People

131 NOWHERE in the world is the influence of geography on people
133 more dramatic than in Inner Asia. Sinkiang lies in the heart of a continent, as remote as possible from moisture-bearing winds from the oceans. On three sides it is enclosed by mighty mountain masses and on the eastern side by wide stretches of barren plateau. The snow-clad Tien Shan or Heavenly Mountains, rising to heights of 23,000 feet, extend across the province from west to east, dividing it into two unequal parts. The southern two thirds are the Tarim Basin, the land of oases and deserts. The northern third is Jungaria, traditionally the land of the nomads. The total area of the province is about 600,000 square miles, or twice the size of Texas.

133 The Tarim Basin is a desert which at its lowest point is actually
132 below sea level. Here men cannot live and farm by rainfall, which averages less than four inches a year. Water is the gift of the great mountains which fringe the desert on the north, west and south, rising in places to more than 20,000 feet. From the melting upland snows and glaciers, rivers cut their way down to the central oval desert. Where each river leaves the foothills, men dig canals to spread the water out in a fan, forming an oasis, so that the edge of the desert along the foot of the mountains is dotted by a series of oases. A trade road, looping around the desert, links the oases like beads on a string, forming a U with the open end toward the east.

[p. 152]

1: Lattimore H-4 (no date) 1950 AI 1 Sinkiang AI 1

In Jungaria there is a little more rain, as much as ten inches a year in the more favored places, and here the desert is neither so vast nor so forbidding as in the Tarim Basin. There are fringes of grazing land on the slopes of the Altai in the north, the Tien Shan in the south, and other ranges in the west, but the herds must move frequently and the men who own them must move too, leading a nomadic life. Men learned to live in this land of poor rainfall only by learning how to master the animals which ate the grass which they themselves could not eat.

In addition to irrigated agriculture there is some dry farming in Jungaria, particularly in the river valleys along the Soviet frontier. Along this frontier, which rarely follows the watershed, three important rivers have their source in Sinkiang and their main course in Soviet territory. They are the Black Irtish, the only Sinkiang river whose waters reach the sea, and the Emil and the Ili, which are routes of communication between Soviet and Chinese territory.

The broad and fertile Ili Valley is enclosed between two arms of the Tien Shan which open toward the west into Soviet territory. It thus forms a distinct region which has closer geographic ties with Soviet territory than with Sinkiang itself. Its forests, mines, rich mountain pastures, and fertile arable lands offer the best prospects for economic development north of the Tarim Basin, but it has never enjoyed a sufficiently long period of peace and sound administration to permit exploitation of its resources. It has been fought over during the successive waves of migration and was largely depopulated in the eighteenth century. At present the valley supports an agricultural and nomadic population of less than half a million.

Both oasis agriculture and pastoral nomadism are such highly specialized ways of life that throughout the history of Inner Asia men never learned how to combine them. Cultivators and herdsmen fought each other, traded with each other, and sometimes ruled each other, but they never fused together in a new, mixed, and permanent society.

The totally new factor of machine-powered industrialism is

3: Skrine G-3 (1922-1924) 1926 All Sinkiang All

after crossing four passes between 12,000 and 16,000 feet high and traversing three different valleys sparsely inhabited by Kirghiz, debouches upon the great plain of Central Asia near the flourishing town of Yangi Hissar. The winter route goes north from Tashqurghan over the easy Ulugh Rabat Pass (circ. 13,500 feet) to the Rangkul Pamir, past the beautiful lakes of Little Qarakul and Basikul, and then down through the tremendous gorge of the Gez River which cuts through the Kashgar Range between the great ice-clad massifs of Qungur (25,146 feet) and Chakragil (22,180 feet). It comes out on to the Kashgarian plain at Tashmalik, whence the city is reached in two marches.

Sariqol is about the most unpopular district among Chinese officials in all Eastern Turkistan. Its capital is 10,250 feet above the sea and has a climate which may be described as three months spring and nine months winter; most of the ten days' journey from the nearest civilization has to be performed on horseback instead of in the Peking cart beloved of the travelling Celestial; last but not least, the inhabitants are an unruly lot, very different from the timid and peaceable Turkis of the plains. Small wonder then that the Governor of Chinese Turkistan at Urumchi has the utmost difficulty in finding men for the post. But he does find them, and what is more he removes and replaces them if (as may be expected sometimes in a place so remote from supervision) they misbehave themselves; a fact which throws a remarkable light upon the effectiveness of Governor Yang's control over a district which is no less than two months' journey from his headquarters.

But though the Ambans may regard themselves as Ugolinos condemned to an Inferno of cold, the summer visitor to Tashqurghan will find much that is pleasing in the marvellous clearness and purity of its air, its spacious greensward threaded with pellucid streams and the beautiful shapes of the mountains which stand in glittering ranks all round, yet not too near it. Conspicuous among these is Muz Tagh Ata, "Father of the Ice Mountains," blazing in all its mighty mass of whiteness over the vivid green of the meadows. Though it is 24,388 feet high, the enormous width of Muz Tagh Ata detracts from its beauty as a mountain, and it does not compare for a moment with Rakaposhi or Nanga Parbat; but its very size is impressive, and the vast extent of its snowfields and glaciers, the whiteness of which has an intense

3: Skrine G-3 (1922-1924) 1926 All Sinkiang All

sized black "Chhota Mao," while the black kitten which was brought to the door by a poor Kashgar woman in the spring and speedily became first favourite was generally known as "Wee Squeakie." *Chong*, I may explain, is Turki for "big," *mao* Chinese for "cat," and *chhota* Hindustani for "small," so that four different languages (or five if you include Scotch) were represented in the nomenclature of the Consulate pussies.

They were happy days we spent at Chini Bagh, and only too quickly did they pass; hardly, it seemed, were we back from one tour before it was time to prepare for another. For halcyon days, halcyon weather is needed; and here the climate played its part right nobly. For those who love the sun and yet like a winter that *is* a winter, the climate of Kashgar approaches perfection. During the whole of our time there was not a single day on which the sun did not shine, if only for an hour, and on four out of five it shone all the time. Not always with its full strength, indeed, because of the dust-haze already described; but it shone. The average rainfall throughout the year at Kashgar is about two inches. Between the beginning of March and the end of July showers and rain-storms are liable to occur, but there is always ample warning, so that they cause a minimum of inconvenience to lovers of *la vie au grand air*. The Turki farmer likes a drop or two of rain during the early summer, but it must not be overdone. Some years ago during a drought the inhabitants of Kashgar requested a certain popular mulla to pray for rain. He did so with great fervour, and shortly afterwards rain fell in torrents, ruining the crops. Whereupon, at the petition of the Kashgaris, the Amban punished the unfortunate mulla with a thousand stripes! I remember during the first rain we had at Kashgar being astonished to see out of the window the gardener hurrying indoors with the geraniums; on being questioned he explained that, as every one knew, rain-water was injurious to flowers and he was taking the geraniums in to save their lives. When it does rain, it is inadvisable to go out until the ground has dried, for the loess clay becomes so slippery with wet that it is almost impossible to keep one's footing. Owing to the extreme "continentality" of the climate—Chinese Turkistan lies further from the sea than any country in the world—the annual range of temperature averages 100° Fahrenheit; the lowest readings in January being in the neighbourhood of zero, while the highest shade temperature in August is 103°

3: Skrine G-3 (1922-1924) 1926 All Sinkiang All

to 105°. Another climatic feature arising from "continentality" is the fact that April is much hotter than October, which is the warmer month in other regions of the globe. 132 •

In winter the ground freezes to a depth of a foot and a half, and all irrigation water stops owing to the choking of the canals with ice between 15th November and the end of February. Yet the Kashgar winter is not at all a formidable affair. The skies indeed are sometimes grey with dust-haze, and for several days in January the thermometer does not rise above freezing-point. But the sun shines most of the time, while as for wind, that terror of cold lands, we had none worth mentioning. Ringed round on three sides by lofty ranges, Kashgar is mercifully windless in winter, so that in spite of the hard and prolonged frost the cold is not severe. We made ourselves very cosy in the evenings in front of roaring wood fires. One of the first things we did to the Consulate was to instal good British open fireplaces, not being content with the cheerless Russian stoves we found in the house: vast shiny black cylinders like the funnels of monstrous locomotives, which disfigured and either under- or over-heated every room. There are usually one or two light snowfalls during the winter, but the snow melts very quickly in the strong sun, except where there is underlying ice. In spring and early summer occasional storms with rain or dust or both vary the monotony of the eternal sunshine, and are also to be welcomed for the exquisite clearness of the air which follows them. At any time in July or August the weather may become, for short spells at a time, unpleasantly warm according to European though not to Indian standards; punkahs are unknown, though I must confess I should sometimes have been glad of one. But the nights are seldom oppressively hot, except occasionally just before a storm. Another fly—to use an appropriate metaphor—in the ointment of a Kashgar summer is the insect life. 136
Mosquitoes and sand-flies are a trial, though not to be compared with those of an Indian plains station; the former are smaller and less robust than those of Hindustan, and both can be effectively circumvented by a mixture of citronella oil and kerosene. At night muslin sand-fly curtains are advisable, unless one is sleeping in the open air and well away from walls.

One would have expected that the cities of Chinese Turkistan, where ideas regarding sanitation and hygiene are of the most primitive, would be hotbeds of disease and regularly 164 364

3: Skrine G-3 (1922-1924) 1926 All Sinkiang All

CHAPTER IX

DESERT, RIVER AND MOUNTAIN

ABOUT the tenth of February the grip of frost upon the land began to relax noticeably, the surface of the ice on the skating-ponds became day by day more slushy and the sun's rays developed a hitting power which surprised us so early in the season. A fortnight later, amid general jubilation, the first muddy water appeared in the irrigation-channels, forerunner of the life-giving floods which in another two months would be sweeping down from the great ranges. Kashgar awoke and stretched itself after its winter sleep. All at once, it seemed, the poplars and willows put out their buds, the soil became soft and moist and the garden resounded with the chatter of starlings, the twitter of martens, the cooing of ring-doves and the hoo-hoo-hoo of the courting hoopoe. Spring was upon us, and at the Consulate our fancy lightly turned to thoughts of the Road. We planned a most attractive ten weeks' tour which would take us first to Merket, on the Yarkand River four marches to the east, thence down-river to Maralbashi and to fair Aqsu, 300 miles along the ancient Silk Road from Europe to Cathay, and back by Uch Turfan and the Mountains of Heaven. In the event, this programme had to be postponed to the autumn, except as regards Merket, but the spring tour that we did manage to carry out, though short, was interesting enough.

Sending our baggage-ponies and all our retinue except the indispensable Hafiz and Sangi Khan ahead the day before, we left Kashgar on 21st March and reached Yupogha, 51 miles east-south-east, the same evening. Our way at first led through a flat country of trees and reedy canals and old farms on the banks of quiet rivers; but the second day the cultivation became gradually more sparse and the country drier as we approached the Takla Makan. That night we slept at a thriving little market-village called Tarim Bazar, where

3: Skrine G-3 (1922-1924) 1926 All Sinkiang All

CHAPTER X

A MURDER CASE AND A DIFFICULT JOURNEY

EARLY summer in Kashgaria is a time of crystal-clear mornings and noonday skies of indigo flecked with argosies of creamy clouds. But the weather is by no means monotonously perfect. Every week or two comes a thickening of the atmosphere and an increasing sultriness which leads up to a *buran* or storm of dust and rain. Compared with those of South Persia or Upper India these *burans* are mild affairs, though further east round the edges of the Takla Makan they can be bad enough. A high wind, a pale brown sky, a consciousness of fine loess dust collecting in one's eyes and gritting on one's teeth; this goes on for some hours, perhaps the whole day, and then comes a drumming and a sputtering of warm rain which passes in an hour or two and leaves the air clean and sweet, the garden full of scent and the landscape of colour. Colour—that is the note of Kashgar in summer. Not only is Nature a rich mosaic of emerald and turquoise and ochre, but Man decks himself—and herself—in every colour of the rainbow. Accustomed to the dirty white or dust-coloured raiment of Upper India and Baluchistan, the effective but monotonous dark red of the women of Rajputana and Central India, the dead white or coal black affected by their sisters in Persia and Mespotamia, I did not know what the "gorgeous East" could be until I saw the bazaars at Kashgar on a summer's morning. The 'Id festival which comes at the end of the Ramazan fast happened to fall in May our first year. This is an occasion on which every one who can afford to do so, man, woman and child, comes out in new clothes—and almost every one can afford them, for the dyed silks of Khotan are dirt-cheap and even the superior products of Ferghana and Bokhara far from dear. To the many-hued cloaks, dresses and pork-pie hats

3: Skrine G-3 (1922-1924) 1926 All Sinkiang All

century before Christ; thousands of years before that dawn the Egyptian, Minoan, Sumerian and other great civilizations existed. Is it impossible that the Tarim Basin, in the heart of that Innermost Asia which is believed by many to be the cradle of the human race, may once have harboured a race as powerful and a culture as advanced as any that flourished on the banks of the Nile, the Euphrates or the Indus?

All depends on the answer to the question: Was the water-supply ever much greater than it is now? In this connection the conclusions of Sir A. Stein in his latest publication[1] are of the utmost interest. Discussing whether the abandonment of Niya, Dandan Oilik and other sites may be assigned to a supposed climatic desiccation of Central Asia, or to some other cause or causes, he points out that definite archæological evidence forces us to two conclusions.

"One is that climatic conditions quite as arid as the present ones prevailed within the big trough of the Tarim Basin as far back as ancient remains and available records can take us. The other conclusion is that the amount of water carried by its rivers has greatly diminished during the same historical period."

How can these apparently contradictory propositions be reconciled? As a possible solution of this problem Sir Aurel propounds a remarkable theory which was verbally suggested to him in 1908 by Colonel Sir Sidney Burrard, late Surveyor-General of India, and recently also proposed by Dr. von Ficker with regard to similar conditions in the Oxus basin.

"This theory" (he says) "seeks the reason for the diminished volume of the rivers in the shrinkage of the glaciers on the high ranges which are their main feeders. It accounts for the shrinkage itself by assuming that those glaciers comprise great reserves of ice which have been left behind by the last glacial period and have since been undergoing slow but continuous reduction through milder climatic conditions. This continued process would suffice to explain shrinkage in the irrigation resources during historical time without the climate of the basin as a whole having in the course of this period, very short in a geological sense as it seems, undergone any appreciable change."

In other words, the glaciers of the Kunlun may be no other than the dwindling remnants of the frozen cap that Asia wore in the last Ice Age. A link with the past indeed!

Sixteen centuries ago even a small stream like the Niya River flowed far out into the desert, watering a flourishing town 20 miles beyond its present disappearing-point at the

[1] "Geographical Journal," June, 1925, pp. 487–90.

3: Skrine G-3 (1922-1924) 1926 All Sinkiang All

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shrine of Imam Ja'far Sadiq.[1] Four or five thousand years ago, presumably, this river and others like it flowed in greater volume still, penetrating far beyond ancient Chingchueh and Dandan Oilik. Those were the days, perhaps, when the great Lop Sea to the east had not altogether dried up, and the "innumerable laughter" of its waves hid what are now the sharp-edged salt clods of the world's worst desert. It may be, then, that in the days when Sargon reigned in Babylon and Manes on the Nile, wide fertile lands and populous cities with a culture and an art of their own basked in the Central Asian sun, and that the glory and the wealth of a forgotten civilization lie hid for ever under the gigantic dunes of the Takla Makan.

[1] "Sand-buried Ruins of Khotan," p. 351.

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*175 under the Ch'ing emperors, reasserted its sway in Turkestan.
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4. Pattern of nomadic expansion and contraction

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175 Wave after wave of nomadic peoples have made their appear-
648 ances and then faded away, leaving the imprint of their stay on the palimpsest of Turkestan. The pattern of their entry, their ascendency, and their exit have been similar. Each outburst and withdrawal of the nomads showed but variations on the major theme. The Huns, the Turks, and the Mongols, to mention a few of the more powerful of the plethora of nomadic peoples, all had their geneses in the same region, an area of Mongolia south of Lake Baikal. The process of their rise to power followed parallel lines. First, there was a bitter internecine struggle from which one group emerged triumphant. Second, the nomadic tribes were unified into a strong coalition under the leadership of the dominant group. Third, they expanded outward from the steppes into neighboring regions, especially into the marginal zone of modern Sinkiang and Inner Mongolia. Then they consolidated these areas into bases of operation for the fourth stage, the invasion and, when successful, the conquest of the opulent agrarian lands. At the peak of their strength, these nomadic invaders would establish a strong, militant empire, under an absolutist government, to control the motley subject peoples under their domination.

But once they reached the peak of their power, the downgrade began. The paucity of their numerical strength made it difficult for them to hold large territories. The tradition of intertribal contest instilled the spirit of independence in the minds of the satraps appointed to rule portions of the far-flung empires. The failure to resolve the incompatibility between pastoral and agrarian economy, and the resentment and rebellious tendency of the subject peoples whom the conquerers were only able to overawe by military strength, were all factors which brought about the disintegration and decline of the empires of the nomads.

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175 5. Theories concerning nomadic eruptions
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648 What accounted for the sudden irresistible ferocity of nomad eruptions and what accounted for the docility of their withdrawal? A number of very ingenious theorires have been advanced, as answers to this intriguing question, but so far these are still in the realm of assumptions.

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175 Many scholars have regarded the influence of climate as a
121 possible cause of the high tide and ebb of nomadic activities.
648 Superimposed on the progressive dessication of Central Asia
• 132 resulting from the withdrawal of glaciers, were the minor cyclic
114 fluctuations of alternating dry and moist spells. A climatologist
182 (C.E.P. Brooks) spoke of the "classical rainfall period of 640 years," and a geographer (Raymond Wheeler) believed in a major alternation of dry and cold every 510 years. Ellsworth Huntington,

a proponent of the theory of climatic alternations, called the phenomenon "the pulse of Asia."

The most important of the multiple influences is believed to be that of the economic effects of climatic changes. When the climate is warm and moist, the land of the nomads is fertile enough to support the nomads and their herds, but when the climate becomes drier and colder, the rivers and lakes shrink and the pasturage is reduced. This cuts down the food supply and forces the nomads to rampage into the land of their neighbors. Speaking of the thirteenth century, Arnold Toynbee declared that the "paroxysm of aridity coincided in date with the demoniac eruption of the Mongols, and it will be seen that the physiographical recoil towards humidity likewise corresponds in date with the rapid ebb of the Mongols." (A Study of History, vol. III, p. 439).

Although the outbursts and recessions of the nomads were periodic, the rigid periodization was too mechanical and many scholars have discredited climate as the sole factor. Huntington suggests that four factors may have impelled the huge migration of the nomadic peoples, namely: climate, the inherent quality of the people especially as manifested by the leaders, the pull exerted by the wealth and the opportunities of the agricultural lands, and the push exerted by over-population. (Mainsprings of Civilization, p. 568).

A period of peace and prosperity would allow the population of the nomads to increase. However, in the desolate steppes, food was dependent upon flocks of sheep and herds of cattle and horses, and the people, unlike their sedentary neighbors, did not have the tradition nor the facilities for food storage. Any sudden change in climate which caused a reduction of pasturage and water supply would create a "time of troubles" and compel the nomadic people to migrate in search of food and pasturage.

When the nomads were experiencing a "time of troubles," the lush riches and the military weakness of the settled peoples would tempt border tribes to encroach upon the agrarian regions. Distress and discontent at home and the lure of wealth abroad furnish the push and the pull of Toynbee's theories. When the leavening of bold leadership and ideas were added, the nomads often were induced to burst out from the steppes of Asia and to set the world in commotion.

Other scholars entirely discount the influence of climate and seek the explanation for the advance and withdrawal of the nomads in social and political conditions. Owen Lattimore, who has given much thought to this question, (cf. Inner Asian Frontiers, passim), lists a number of reasons other than climate, for the eruption of the nomads. There were, for example, technological factors like the invention of the powerful compound bow and the technique of mounted archery which gave the nomads an edge over their enemies.

1: Washington S-4 (no date) 1956 AF13 Northwest China AF13
Sinkiang AI1

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132 thirty-four degrees Centigrade. The larger the annual difference, the more obvious is the seasonal differentiation.

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• 132 In Sinkiang, the highest temperature of the year is in July. The lowest temperature of the year is in January, in Southern Sinkiang, and in February in northern Sinkiang. The temperature curve is very sharp. The average temperature for the coldest month of the year is from minus seven to minus sixteen degrees Centigrade. Khotan, in southern Sinkiang, has minus seven degrees Centigrade; whereas Altai, in northern Sinkiang, has minus 16.9 degrees Centigrade. This variation of 9.9 degrees is explained not only by the locations and altitudes of these two places but mainly by the abrrier of the Tien-shan. All the recording stations of former Sinkiang Province generally have a mean January temperature below zero. The only difference is that there are three months below zero in southern Sinkiang and five months below zero in northern Sinkiang.

The obstruction of the Tien-shan greatly influences the climate. Statistics show that all the weather stations in southern Sinkiang have a mild temperature compared with those in northern Sinkiang. This is due to the fact that the former are well-sheltered by the mountain ranges. For example, the difference in latitude from Urumchi to Kucha is only two degrees, but the temperature in January in Kucha is minus fourteen degrees Centigrade and in Urumchi is minus 19.3 degrees Centigrade. Due to topographic differences, the variation is 5.3 degrees.

Summer temperatures are relatively uniform. In Sinkiang, for instance, the range of temperatures is twenty-two to twenty-five degrees. The July average is 24.2 degrees Centigrade at Urumchi, 23.9 degrees at Kucha, 23.1 degrees at Ili, and 22.2 degrees at Ta-chang. Altai, in the extreme north, has an exceptionally low average temperature, only 20.9 degrees Centigrade. In contrast, the stations in southern Sinkiang, such as Kashgar and Khotan, have a mean temperature for July of more than twenty-five degrees Centigrade. The hottest place in Sinkiang is Turfan, which has 33.7 degrees Centigrade in July. This is the place noted as a "fire district" (Ho-chou) in Chinese history. During its hot summer days, the natives retire to underground chambers. There are two explanations for this extreme heat. First, Turfan is in a depression; it is forty-five feet below sea level. Second, Turfan is surrounded by mountains. When the air masses move in, they are warmed and rise in a conventional current.

Continental climate changes rapidly, both daily and seasonally. It differs from south to north. For example, at Khotan the year range is 32.4 degrees Centigrade; at Kucha

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132 it is 37.9 degrees, and at Urumchi it is 39.4. Because of its topographical conditions, the range at Turfan is greater, amounting to 40.8 degrees Centigrade. At all the stations, the yearly range of temperature is above thirty degrees. As to daily difference, the temperature varies more than twenty degrees. This is particularly true in summer when the earth absorbs heat and loses heat more easily.

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132 Rainfall is meager throughout Northwest China. Generally, it is below 250millimeters. According to some data of the western stations of Kansu, Chang-yeh District has ninety-five millimeters; Chiu-ch'uan has eighty-one millimeters; Tun-huang has forty-six millimeters. The farther inland, the more obvious is the continentality and the less is the precipitation. Summer is usually the period of maximum precipitation. In Chang-yeh District the maximum precipitation is in July, August, and September. They have almost constantly seventy-four percent of the rainfall of the year; whereas the winter months, December, January, and February, have only five percent. The rainfall of the summer months in Chiu-ch'uan is approximately seventy-two percent of the year, but it drops to five percent in the winter months. The variations of the rainfall of Kansu Province are generally above forty
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[241] percent, an amount definitely insufficient for agricultural usages. Irrigation in Kansu depends mainly on melting snow water from Ch'i-lien-shan rather than rainfall.

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[131] Sinkiang is located approximately in the center of Asia. Blocked by the huge mountains and gigantic desert, the moist air from the ocean can hardly move into the area so the atmosphere is dry, except in the northwestern section of the province where the topography is relatively open toward the west. When the western winds are strong, moist air is moved into the province. Rainfall is, therefore, heavier. According to the statistics, the mean precipitation is 229 millimeters at Urumchi; 280 millimeters at Ili; 274 millimeters at Chuguchak; and 149 millimeters at Altai. In southern Sinkiang all the stations are separated from the ocean by huge mountains and rainfall is light. For this reason, Kashgar receives only eighty-six millimeters precipitation a year; Kucha receives seventy-six millimeters; and Turfan receives twenty-
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[161] nine millimeters. Charklik (Erh-chiang) has only 4.5 millimeters in a year. It has been reported that in the Han Dynasty there were a thousand families living in the district. In 1943, there were only three families with some eleven persons remaining. The meagerness of precipitation through the years and the encroachment of the desert are the major causes for the rapid decrease of the population in CharKlik. In some

S 132 places not even as much as 4.5 millimeters falls through the year. There are no longer a series of records showing either the temperature or the precipitation of the area, but the available data show that the total precipitation consists of snow water as well as summer rain in certain parts of the province.

N 132 In the geographical distribution of rainfall there shows a marked contrast between the shady side of the mountainous areas and the oases. On the whole, the southeastern part of Kansu and Shensi receive a relatively greater rainfall than the northwestern sections. For instance, Wu-wei district, in the southeastern section of Kansu, has a comparatively high precipitation, and Chiu-ch'uan, because of its location in the northwestern section of Kansu, has a precipitation that N [241] is relatively low. The former is considered an area of agricultural dominance; the latter, due to less precipitation, makes for agricultural uncertainty.

Because the warmer southern air has been blocked by the Nan-shan and Chin-ling on the southern border of the region, the temperature of Kansu and Shensi is relatively lower than those places in the same latitude in eastern China. For instance, the January temperature in Peking is minus 4.7 degrees Centigrade; in Chiu-ch'uan it is about minus nine degrees Centigrade. In July the temperature in Peking is 25.3 degrees Centigrade, whereas in Chiu-ch'uan it is 23.8 degrees Centigrade. This is due not only to the influence of location - one near the coast and the other inland - but also to the fact that the mountain range runs from west to east as the barrier which shuts off the warm, moist winds from the southeastern coastal areas of China.

S 132 Furthermore, the distribution of precipitation of Sinkiang differs from south to north of the Province. The mean annual precipitation at Kashgar is 89.4 millimeters of which over two thirds, or around seventy three percent, falls in the spring and summer. At Urumchi it is 228.8 millimeters, of which twenty-four percent falls in winter; thirty-four percent falls in spring; fifteen percent falls in summer; and twenty-seven percent falls in autumn. At Kashgar the precipitation is greatest in summer and at Urumchi it falls largely in the spring and autumn months. The Takla Makan desert absorbs the limited moisture from the air. However, in northern Sinkiang the topographical features are comparatively open so that the Arctic Oceanic winds blow toward the area more easily. Thus precipitation is evenly distributed throughout the year.

The dry air reduces cloudiness and thus increases sunshine. S [241] The agricultural activities of the area depend largely upon the brilliant sunshine for melting snow on the mountains for irrigation.

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132 irrigation. There is, therefore, a common saying in the area that sunshine equals rainfall.

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132 Generally speaking, Northwest China is affected by the high pressure of the Mongolian Plateau. It is windy throughout the year, particularly in the spring. There are also local cyclones on the Gobi desert during the hot summer. These cyclones are relatively short-lived and remain within one area. Winds blow more strongly in the spring than in other months of the year, because at this time the center of the high pressure area is moving toward the northern part of Central Asia and Northwest China is just beyond the edge of the high pressure. Since Sinkiang is in the high pressure circle in
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[132] the winter, the wind blows calmly. When the strong winds sweep down to the ground in spring or summer they do much damage to agricultural crops. Therefore, the places which face such strong winds are the places where agricultural products are relatively poor.

In summary climate is modified by topography and the distance of the area from the sea. Northwest China is located in the interior of China and is remote from seas. The huge mountains and the gigantic deserts render the climate generally dry throughout the year. According to Koppen's classification, the area lies in the zone of B climate; that is, the potential evaporation exceeds precipitation. Owing to topographical features' influence upon climatic changes, it is always drier
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[132] on the southern and sunny sides of the mountains than on the northern and shady sides of the ranges. In southern Sinkiang, for example, the climate is classified as a dry desert type; whereas, in northern Sinkiang, it is a steppe climate. This difference is mainly due to the amount of precipitation. In the steppe regions the precipitation is always greater than it is in the desert area.

In Northwest China, the temperature changes rapidly from day to day and season to season. Precipitation is greatest in the summer months but it is not reliable.

II. Mineral Resources.

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135 A. General Distribution and Some Specific Importance

Northwest China is a poverty-stricken area, due in part to insufficient fainfall and also because it was until recently, practically an unexplored region in regard to its natural resources. Although the coal reserve of Shensi is known to be rich (next only to its close neighbor, Shansi,) (if reported recent discoveries in the Northeast are left out of consideration), it has not been mined to any great extent due to the lack of a nearby market. The only other promising mineral is the

000 oases. A trade road, looping around the desert, links the oases
133 like beads on a string, forming a U with the open end toward the
491 east.

131 Dsungaria is in northern Sinkiang, between the Tienshan and
the Altai mountains which mark the frontier between Sinkiang and
132 Western Mongolia. Precipitation here is slightly higher, and
137 steppe vegetation makes pastoralism possible. Northern Dsungaria
233 was the avenue of migration followed by the Mongols in their west-
[487] ward conquests.

2. Pastoral nomadism

233 In 1943, there were 11,720,000 sheep and goats in Sinkiang, 1,550,000 cattle, 870,000 horses, and 90,000 camels, totalling 14,230,000. In 1947 the province reported 12,266,000 sheep and goats, 1,659,000 cattle, 1,027,000 horses, and 85,000 camels, a total of 15,037,000. The total has remained somewhat constant over a period of time, probably due to the fact that pasture land is poor and care of the herds inadequate. Most of the livestock are in Dsungaria, pastured in the steppe land by nomad Kazakhs or Mongols. There are many variations to the techniques of herding animals since cattle, horses, and camels each prosper best on different kinds of pasture. The problem is to devise the best combinations of animals to be maintained and to select the appropriate pasture, decide how long to remain on a pasture, when to move, and how.

3. Oasis agriculture

241 There are two kinds of oases in Sinkiang: those in the south,
312 which are sharply isolated from each other by desert stretches and the oases of the north, which have fringes of land in which rainfall farming prevails. When irrigation was introduced, it seems to have been practiced first on the lower courses of the rivers, where the soil was soft and the engineering problems required only the digging of simple ditches from the banks of the streams. In the course of time, as knowledge of engineering developed, the tendency was for the oasis to move upstream toward the boulder slopes at the edge of the foothills, but not back into the gorges where the problems were far too great.

Oasis engineering is extremely simple. The basic pattern is a main canal from the river, branching into smaller canals which branch in turn into ditches which deliver water to the fields, all arranged so that water flows by gravity from level to level, without the pumping or bailing devices which are widely used in China and in Soviet Turkestan to lift water from lower to higher levels.

[133] In volume of discharge, the rivers of the Tarim system are far behind the two great rivers of Soviet Inner Asia, the Syr Darya and the Amu Darya. The total discharge of all streams in Sinkiang is about 3400 cubic meters per second, of which about seventy per cent is in the Tarim Basin. In irrigation engineering

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hand, Islamism, which had been temporarily repulsed by the Mongols, again closed in, so that Turkestan became one of the strongholds of the Moslem faith.

The trend of political events during the last few years has resulted in movements no less epoch-making than were the invasions of the Mongols and the Huns. A wave of race-consciousness and of national enthusiasm has swept over the peoples of Central Asia and caused them to hearken to any voice which has promised to secure them the liberty and self-determination they so much covet. 'The East is undergoing a concentrated process of adaptation which, with us, was spread over centuries, and the result is not so much *evolution* as *revolution*.'

The situation is pregnant with spiritual possibilities, for the old and the new are struggling fiercely, and that struggle will result in anarchy and lawlessness, unless the hearts of men be captured and re-created by the Christ Who alone makes men free.

The Church Militant is represented in the territory stretching from Suchow to Siberia by *one* Mission Station occupied by *two* men.

CHAPTER XXXVIII

TRAVELLING IN THE 'GREAT HEAT'

THE trying season known to the Chinese as Ta Shu—'Great Heat'—was upon us. Hami was indeed hot, and Mr. Hunter warned us that not until we reached the other side of the Tian Shan could we hope for any alleviation. From Hami two main trade-routes, known as the Nan Lu—'South Road'—and Peh Lu—'North Road'—run in the respective directions their names

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dare to detain us, and the head of the firm had given notice of the day we should cross the frontier; but we never knew a moment's peace till we were out of the hands of that gang. How different from General Feng's soldiers! We passed right through their fighting lines, and they never seized even our little donkey! The officer said, "These men are honest apprentices; they have a long journey ahead; no one is to touch them, their goods or their donkey!" That's something like an army!'

The following morning we reached 'Third Halt,' which we found to be a torrid place, lying in a cup of the hills. Our inn rooms were intolerably hot, and after a brief rest we got up and sat under the trees, hoping to escape from the flies, and also seize the advantage of any passing breeze. While resting there we heard the sound of the familiar camel-bell, and looking up watched a string of sixty of these beasts cross the village stream. The banks were muddy, and the awkwardness of the camel when walking on slippery ground was evident. These beasts frequently come to grief when attempting to travel on other than sandy roads, and broken legs are not infrequent at a river's edge. The driver was a Barkul man, which city is colonised by Chinese, many of whom make their living by grazing camels. The Turki is of no use as a camel driver. He is too impetuous, and seems unable to give these animals the peculiar care which they need. Strong, long-lived, and enduring, as they are under good conditions, they easily lose heart, and once overdriven never recover. Rough treatment, hustle or untoward difficulties play havoc with these creatures, whose temperamental qualities seem to be as strange as their physical peculiarities. Once their spirit is broken they are of no further use, and lie down and die.

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asses and of bronchos, reputed to be untameable. We were now at an altitude of 5500 feet, and on the edge of a bare plateau overlooking a depression to the south, from which a road led off in the direction of Turfan. It was an ancient road, now in disuse, being considered too dangerous for caravans. The wind blows down this valley with such tremendous force that whole caravans have perished, the carts being blown to pieces and the men and beasts overwhelmed by the whirling sand. The innkeeper pointed out a spot called San Chien Fangtz—'The Three Rooms'—where eighteen carts laden with silver are said to have totally vanished. Acting as servant to this innkeeper was a young man who greeted us with sheepish cordiality. 'You got away all right from Hsinghsinghsia,' he said, and he proved to be one of the men who had escaped on the rainy night of our stay there, and who had not been recaptured.

Leaving that afternoon, we saw a lizard differing from any we had met with in other parts of the desert. It was about one and a half feet long, and was too quick for the carters, who chased it with their whips but failed to catch it. Continuing uphill between rocks, granite boulders, and volcanic slopes, over a stony road, we reached Chekuluchüan—'Cart Wheel Halt.' Of the three inns which formed this hamlet, two were untenanted and the third was badly broken down. Some of the rooms were roofless, while in others large holes had appeared in the walls, but having accomplished the short stage we were thankful to get rather longer hours of sleep than usual, and felt greatly refreshed by the cooler air of this quiet spot. The little row of inns stood in a gorge between stony hills, and the force of the gales through the narrow ravine was so great as to have worn the rocks into hollows, in the depths of which

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133 birds had made their nests. This was the most striking
132 example of wind erosion that we saw.

This last stage had been taken in company with Mr.
494 Hunter, whose little cart frequently made better stages
491 than our heavy vehicles could manage. At this point we were all needing small repairs to our carts, and also the stony roads had become very heavy on the shoes of our teams, but Mr. Hunter now produced a travelling farrier's outfit, and with the help of his man shod the mules, greatly to the admiration of the Chinese by-standers, who commented freely on the resourcefulness
563 of this experienced traveller. Mr. Hunter's man was a Mongolian youth, called 'Nimga.' The Living Buddha, to whom he was subject, had given him as an orphan boy to the missionaries. He always slept where he could watch the horses, and on one occasion, when he felt certain that horse-stealers were prowling around, lay down on a horse's back and slept there. His horsemanship was splendid, accustomed as he was to riding from infancy.

609 The Turki innkeeper, a tall, lean, bearded Moslem, looked with some suspicion at this party of foreigners. 'What have they come for?' he asked Mr. Hunter. 'Is it bones, plants or game that they want?' 'Nothing of the kind,' was the answer, 'these are missionaries.'

'Oh, that's different,' he grunted, 'but some of those who come, why there's no knowing what they want! There was a man here once upon a time, and his servant told me that he came to Chekulu in order to measure the distance to the sun! A likely tale! Couldn't he measure it in his own country? Surely you can *sometimes* see the sun in Western lands?'

491 For four hours that evening we descended a smooth,
137 downhill road, and on reaching the plain entered a sandy basin about twenty miles across, the lower part

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of which was full of tamarisk mounds. Many of these stood twenty feet high, and here, as everywhere in the desert, each plant was raised on a mound accumulated round its roots, this being the soil blown by the wind from some more fertile region. Among the tamarisks were plants of Saksaul (*Anabasis Ammodendron*), whose contorted stems, grey cracked bark, green plumes of small greyish leaves, and pink fruit differentiated them from the more feathery species. It has been computed that these tamarisk hills may be from 500 to 1000 years old. The trunks of a forest of dead poplars stood beyond, and added a final touch to the desolation of the scene.

Tsikioking—'The Seven Cornered Well'—stands in the sandy basin, and is now a place of some importance, boasting a small Government Official who also controls the post-office. It is here that the roads divide which lead from Hami to Turfan, and Hami to Kucheng. We were following the latter, but the telegraph wire went via Turfan to Urumchi. Great as was our desire to see Turfan—a most interesting locality—we realised that it was scarcely safe to enter such a hot area at midsummer. We were warned that at this season people were dying from heat, and that the inhabitants protected themselves by spending the hours from sunrise to sunset in underground cave dwellings. The Turfan depression descends to two hundred feet below sea-level, and presents conditions most favourable to agriculture but almost insupportable to man. Tsikioking is better supplied with fuel than any of the surrounding oases, and in winter its population is increased by families who move here for those months. The best fuel known in the desert is the root of the tamarisk. It is of dark hard wood which, chopped into small pieces and sun-dried looks like coal, and has a great deal of its burning

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The chief interest of the town, to us, was the presence of two elderly men, brothers, who thirty years ago moved here from Hsiaoi in the Province of Shansi. They were Christians, having been converted from idolatry by the preaching of a Chinese pastor, Hsi by name, a Confucian scholar of repute, who became a devoted Christian, and was the first ordained Chinese minister of the Shansi Church.[1] From the time of their arrival they never made a secret of their Christian profession, and every Sunday the shop is closed. Divine service is conducted in the back premises by the elder brother, and all apprentices are required to attend. On Sunday morning the small Christian community gathered in the back shop for worship. The room had been swept, dusted, and polished for the occasion. The traditional Shansi hymns were sung to the traditional tunes, and these good men sat down with us after service to a traditional Shansi meal. Listening to their Shansi *patois*, it was hard to believe that we were not back in our own Province, as it was thirty years ago.

On Sunday afternoon the Tian Shan were enveloped in threatening, inky-black clouds, such as indicate a tremendous storm in the mountains, but the rain did not reach us until 10 p.m. Every arrangement had been made for a midnight start. Our carts were packed, and we had lain down in them for a little rest before leaving. No sooner had we done so than the storm burst, and the rain poured down until 6 a.m. By this time the courtyard was an indescribable mass of soaked rubbish, the pigs wallowed in pools of water, and it was impossible to cross from one side to the other.

[1] See *Life of Pastor Hsi*, by Mrs. Howard Taylor: *Fulfilment of a Dream*, by Mildred Cable.